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TECHNOLOGY DEPT.

SCIENCE NEWS LETTER

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THE WEEKLY SUMMARY OF CURRENT SCIENCE • FEBRUARY 5, 1944

Aerial Drama

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A SCIENCE SERVICE PUBLICATION

PSYCHOLOGY

Seizures Caused by Diet?

Wild Norway rats caught in alleys do not have fits like epileptic seizures which are produced in laboratory rats by loud and high-pitched noise.

➤ THE FITS like epileptic seizures that are brought on in some laboratory rats by loud and high-pitched noise do not occur in the same kind of rats that have lived a wild life in the alleys, cellars, factories and granaries of Baltimore.

This surprising difference between wild rats and their domesticated cousins was found by Dr. William J. Griffiths, Jr., of the Psychobiological Laboratory, Phipps Clinic, Johns Hopkins University. (*Science*, Jan. 21) It may be due, he thinks, to the stock laboratory diets, deficient in minerals or vitamins, fed to the laboratory rats, or to the sheltered life they lead.

Seven wild Norway rats selected at random from a large number caught for another purpose were tested with shrill whistles, jingling keys and hissing air blasts.

Not one rat had a fit; not one ran about in wild excitement as do the laboratory rats exposed to such noise. None showed fright by trying to run away from the offending noise. Instead of any display of "jitters," these wild rats tried to attack and bite the noise-maker.

Previous experiments by other investigators had already showed that diet plays an important part in preventing the noise-caused seizures, Dr. Griffiths pointed out. Domesticated rats never before subject to the fits began to have them when placed on a diet deficient in magnesium, thiamin or pyrodoxine. It is quite possible, Dr. Griffiths said, that many of the stock diets fed domesticated rats are deficient. Some of his studies indicate that Purina dog chow, widely used, is deficient in thiamin.

But there is some evidence, he believes, that lack of experience in meeting new situations may play an important part in producing the seizures in domestic rats. They live sheltered lives in their cages. Wild rats, on the contrary, owe their very existence to their ability to react adequately to constantly changing situations. They become "tough" and develop strong patterns of aggressive behavior.

Dr. Griffiths does not draw any parallel for humans from his experience. The rat, although like humans in many ways particularly as to dietary needs, has a different brain and nervous system. Humans have not been known to have epileptic seizures as a result of noise. But noise combined with the fears and horrors of combat do have an effect on the nervous system of some humans.

Science News Letter, February 5, 1944

MEDICINE

Brain Waves Show Injury

➤ WHEN a soldier bumps his head in an obstacle course, or a sailor tumbles out of his hammock, it is not easy for the medical officer to tell whether the man has been hurt or not. Usually the only evidence, outside of a headache or slight temporary dizziness, is that provided by a few trivial scratches or black and blue marks. Yet, occasionally, the man may have a slight concussion and should be relieved from duty and given complete rest.

The brain itself can be made to signal the extent of the injury, it is revealed by three naval officers. (*War Medicine*) By recording the brain waves from all men with minor head injuries at a naval training station, these officers—Lt. Comdr. Herbert I. Harris, M.C., U.S. N.R., Lt. Comdr. Cecil L. Wittson, M.C., U.S.N.R., and Lt. Comdr. William A. Hunt, H-V (S), U.S.N.R.—found they could pick out those who needed rest or treatment from those who were all right.

Whenever the brain wave record was found to be abnormal, the activity of that man was restricted for one to three weeks after which another brain wave record was made. If the second record was normal, the man then returned to active duty.

In one case it was found that the second brain wave record was not better, but much worse. This brain record was from a young apprentice seaman who had tumbled from his hammock. He had been hit by an automobile when he was eight years old and had been unconscious for more than an hour. After this childhood accident he suffered recurring headaches and dizziness for years. Apparently the new head injury, although a minor one, had reawakened the previous trouble. Without the direct signals from the brain itself, this condition might not have had prompt treatment, because the only visible sign of his hurt was a scratch over one eye.

Science News Letter, February 5, 1944

EDUCATION

Ten Scholarships Offered To Outstanding Seniors

➤ TEN George Westinghouse Scholarships, valued at $1,850 each, are to be awarded this year to outstanding seniors in American high and preparatory schools, the Westinghouse Electric & Manufacturing Co., has announced.

The scholarships are designed to provide a full college course in engineering at the Carnegie Institute of Technology. The winners are under no obligation to enter the employ of Westinghouse after graduation.

Science News Letter, February 5, 1944

OPTICS

Over 1,000,000 Soldiers Get Glasses Through Army

➤ UNCLE SAM has given eyeglasses to more than 1,000,000 soldiers to improve their eyesight and make them more efficient for military duty, the American Optical Company stated in an Army-approved announcement.

The eyesight improvement program started when the Army decided that too many men were being rejected because of eye defects. Liberalization of Army eyesight requirements and the spectacle service followed. Ophthalmologists and optometrists equipped with the latest instruments examine the soldiers' eyes for defects and Army optical technicians fit the glasses prescribed. The spectacles have a special frame of durable white metal capable of withstanding rough usage. The frame was designed by the American Optical Company at the request of the Surgeon General of the Army.

Science News Letter, February 5, 1944

ASTRONOMY

Faintest Star Discovered

A million like it would be needed to equal the brilliance of our sun. Finding will help astronomers understand the nature of such stars.

➤ THE DISCOVERY of a star of such extremely low luminosity that a million stars like it would be needed to equal the sun's brilliance has been announced from the McDonald Observatory of the Universities of Chicago and Texas.

This important contribution to astronomical observations follows closely upon the heels of the finding at the same observatory of an atmosphere of methane around Saturn's largest satellite. (*See SNL,* Jan. 29)

The present discovery was made by Dr. G. Van Biesbroeck of the Yerkes Observatory when comparing two plates taken at the prime focus of the 82-inch McDonald Observatory reflecting telescope. On these plates the star known as "BD plus 4 degrees 4048" is found to have a companion star at a distance of 74 seconds of arc away.

The companion is identified by the fact that it shares the apparent motion of the brighter star across the sky; the companion itself is of the 18th magnitude as seen on the plate.

In order to determine the intrinsic brightness of this star, however, its distance from us must be known; this is of course practically the same as that of the primary star. This star happens to be rather close to the sun as astronomical distances go, its distance being about six parsecs, or 19½ light years. In other words, light traveling at some 186,000 miles per second requires nearly 20 years to reach us from that star.

However, the nearest star is no nearer to the sun than one-fifth of this distance. The faint companion star's intrinsic luminosity comes out very faint; it is expressed by astronomers as being of absolute magnitude 19 on red plates. This makes it three magnitudes, or about 15 times, fainter than the faintest star previously observed, Wolf 359, which has a red absolute magnitude of 16.

Wolf 359 is only eight light-years away, so its earlier discovery is not surprising. The sun is on the order of a million times as bright as the new faint star.

In making his announcement, Dr. Van Biesbroeck calls attention to the fact that if this star and Jupiter were placed at the same distance, Jupiter at its brightest would still be seven magnitudes fainter than the companion of the star known as "BD plus 4 degrees 4048." This is a factor of about 600 times and makes it fairly certain that the faint star is shining by its own light rather than reflecting light from its primary; whereas Jupiter shines only by reflected sunlight.

Jupiter is the largest planet in the solar system, so it is also one of the brightest even though it is five times as far from the sun as the earth is. The new faint companion star, however, is some 440 times the earth-sun distance from its principal star which makes it quite certain that its light is not reflected. At present nothing can be said about the mass of this newly found faint star but it must evidently be rather small unless it is some unusual sort of highly condensed star. Ordinarily the mass of a star is closely related to its luminosity.

The importance of this problem is its relation to that of the recently discovered stars of very small mass such as the invisible companion of 61 Cygni. This latter star discovered by Dr. K. Aa Strand of Swarthmore has a mass only 16 times that of Jupiter but Dr. Strand's observations reveal nothing of its brightness. The small star is invisible, and is detected by its gravitational effect on the primary star around which it revolves.

Is Van Biesbroeck's new star of as small mass as Dr. Strand's? If that question can be answered considerable light will be thrown upon whether to call such small and faint objects stars or planets. Astronomers are at present undecided which term ought to apply, but discoveries such as Dr. Van Biesbroeck's are rapidly clearing up the matter. It is possible that the distinction between planet and star may some day almost cease to be plausible.

Included in the information supplied to the Harvard clearing house by Dr. Van Biesbroeck for distribution to American and foreign astronomers is that the position angle of the faint star is 150 degrees; that the common proper motion is 1.45 seconds toward 204 degrees; that the parallax is 0.17 seconds and the projected separation is 440 astronomical units.

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NOT THE DEVIL—But a restoration of a Hopewell Indian with a ceremonial deer-antler headdress of copper. These mound-building Indians left objects of copper, mica, stone and silver, showing great skill and artistry. Part of the exhibit in the new Hall of Indian America at the Chicago Natural History Museum. ***(See also page 86)***

AERONAUTICS

Sound-Proofing of Aircraft Needed to Protect Crews

➤ SOUND-PROOFING military aircraft, to a reasonable extent, has been found highly desirable to protect flight crews from progressive deafness and from physical fatigue and nervousness caused by exposure to excessive noise and vibration, declared Albert A. Arnhym of the Solar Aircraft Co., San Diego, Calif., at the New York meeting of the Institute of the Aeronautical Sciences. The high degree of sound-proofing mandatory in commercial airliners is out of the question in warplanes.

"The main sources of noise on an airplane, in the usual order of their magnitude, are: propellers, exhaust, en-

gine, and aerodynamic, airborne, ventilating and miscellaneous noises," Mr. Arnhym stated.

Various technical methods of decreasing noises at their source were discussed by the speaker. Aerodynamic noises, caused by the flow of fast-moving air over the plane and its parts, are decreased by proper design of the plane. Airborne noises are those which originate during flight and are usually due to inefficient design.

Cabins in military planes necessarily contain many openings through which outside noises enter. In commercial airliners these noises can be kept out. In military planes part of them may be absorbed by covering the walls and ceiling with suitable materials "to trap the soundwaves which strike them in millions of diminutive air pockets and convert the sound energy into heat."

Sound-proofing materials must be easy to flame-proof without losing their properties, highly moisture-repellent, vermin-proof, stable, easy to apply, and have good heat insulation values.

Science News Letter, February 5, 1944

ENGINEERING

Not For Automobiles

High-octane fuels are not suitable for car engines. Any machine which could be developed would be too heavy, too noisy and too expensive.

➤ HIGH-OCTANE fuels such as are used in aircraft, are not suitable for ordinary automobiles. These fuels produce tremendous pressure, and any automobile engine which could be developed to use them effectively would be too expensive, too heavy and too noisy.

This is the opinion expressed by C. B. Veal, of the Coordinating Research Council, Inc., New York, at the Detroit meeting of the Society of Automotive Engineers. The council he represents is sponsored jointly by the Society of Automotive Engineers and the American Petroleum Institute.

Even if designers should produce an automobile engine capable of satisfactory operation with high-octane fuels, petroleum refiners would be forced to adopt expensive and uneconomical refining methods, he stated.

"Production of these fuels consumes special chemicals at costs prohibitive in peacetime," he added, "and greatly reduces the yield of fuel per barrel of crude oil."

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Chrome-Plated Cylinders

➤ CHROME-PLATED cylinder barrels of new automobile engines give longer service life, and the art of plating worn cylinders is developing into a science. New plating techniques which make engine cylinders highly resistant to wear and corrosion were presented at the meeting of the Society of Automotive Engineers by B. A. Yates of the McQuay-Norris Manufacturing Company of St. Louis.

Treated surfaces are showing a wear-life several times greater than that of metals generally used, he said, assuring longer periods and higher operating efficiency between overhauls. He indicated that salvage of worn cylinders presents unusual problems. The preparation of the surfaces requires specialized techniques in grinding, honing and finishing, but scientific methods are proving satisfactory.

Chromium-plated piston rings, particularly with the top ring plated, drastically cut engine wear, according to Tracy C. Jarrett of the Koppers Company, Baltimore, who presented data to show that with such rings, even under abnormal dust conditions, cylinder wear is cut one-half at least. The data indicated that a 2,000-horsepower engine operated 590 hours developed cylinder wear of only 0.003 inches when a porous chromium-plated ring was run in a chromium-molybdenum cylinder. With a plain cast-iron ring, 307 hours of operation produced more than twice this amount of wear.

Science News Letter, February 5, 1944

Proper Machine Assembly

➤ THE MAN with the wrench holds the responsibility for the service life of assembled machine parts, declared J. O. Almen of the General Motors Corporation at the same meeting. "Just how much he tightens a nut, bolt or stud determines the ultimate working life of the assembly." He is "held to be a factor 16 times more important than design, metallurgy, or processing."

"Good design and materials, heat-treatments, and superior manufacturing processes all are desirable," Mr. Almen said, "but the fatigue strength of highly loaded bolts, studs, and nuts finally is determined by the man with the wrench—and how little, or much, he applies that tool in the tightening procedure."

Tests show, according to the speaker, that if the initial tension on a bolt is increased from 1,420 pounds to 8,420

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pounds, fatigue durability goes up from 5,960 stress cycles to more than 5,000,000. When a nut is tightened against reasonably rigid abutments to produce in the bolt a tension equal to or greater than the working tension load, the speaker stated, practically no stress change takes place and the bolt's operating strength approaches its static strength.

Science News Letter, February 5, 1944

AERONAUTICS

Indium Used on Planes

Rare metal adds life to aircraft engine bearings and propeller blades. Coatings of zinc-indium combination eliminate need of greasing surfaces.

➤ INDIUM, one of the rarer and less known metals, is contributing to the war effort by increasing the service life of airplane bearings and propellers. Known to chemists for 80 years, indium has been used commercially for only the past 15 years or so. A small amount of it added to nonferrous metals gives them greater tensile strength, increased hardness and resistance to wear, friction, abrasion and corrosion.

The search for a source of indium in the United States, beginning early in the twenties, its successful location in connection with zinc ores, and its separation and purification, were discussed at the New York meeting of the Institute of the Aeronautical Sciences by William S. Murray, president of the Indium Corporation of America. Prior to the search its values in stabilizing nonferrous metals had been proven.

"The aviation industry," he stated, "was the first industry to recognize the value of indium-treated bearings."

These are mostly a silver-lead-indium alloy. The same bearing material is used in automotive and stationary engines. Aviation engine bearings with indium-diffused surfaces can be overspeeded and over-loaded without fear. "Because of relatively high oil temperatures, because of the generation of acid in the oil and because of heavy loads and the necessity of having a surface of high wettability, indium is of prime importance and has contributed vitally to the efficiency of your power plants," the speaker continued.

Coatings of a zinc-indium combination have proved satisfactory in laboratory and service tests for airplane propeller steel blades, to protect them from corrosion and wear. The coatings adhere firmly to the steel, and do not chip or peel. Use of indium eliminates the need of greasing or oiling the blade surfaces.

Some half-million ounces of indium are now available annually in the United States. Most of it is produced as a by-product of zinc and lead operations. It is a silvery white metal, softer than lead, both malleable and ductile. It is used as a dental alloy and in silverware to harden the silver and give it greater surface stability.

Science News Letter, February 5, 1944

Fire Hazards Decreased

➤ FIRE HAZARDS in aircraft will be greatly lessened in the future by the use of proper materials connected with engine installations, automatic fire-detection devices, and semi-automatic fire-extinguishing apparatus, predicted Harvey L. Hansberry of the U. S. Civil Aeronautics Administration at the meeting of the Institute of the Aeronautical Sciences.

Studies to determine fire-resistant engine installations in future aircraft, and to develop fire-extinguishing systems for use in aircraft already in service, have been under way for the past four years by this government agency. In its studies and tests four basic investigations were made concerning fire resistance of materials, fire sources, fire detection, and fire extinguishment, Mr. Hansberry said.

The material tests, he stated, "have proved the superiority of steel over aluminum alloy in and around the engine installation." Fire-detection apparatus should warn the pilot within three seconds of the ignition of a fire. They should be located in all areas through which flame might pass regardless of the location of the fire source.

Science News Letter, February 5, 1944

Stall-Warning Devices

➤ NEW stall-warning devices, now perfected, for use on private flying planes probably will greatly lessen the number of fatal accidents. This is the opinion of James George of the Civil Aeronautics Administration, expressed at the meeting of the Institute of the Aeronautical Sciences, where he announced the development of two new reliable stall-warning devices by the office he represents in cooperation with several industrial and college research laboratories.

More than half the fatal private flying accidents are caused by stalls, with a death toll exceeding 100 a year, he stated. The new devices will warn pilots of approaching stalls so that they may take the necessary steps to prevent crashing. The devices will be low-cost, dependable, light in weight, and easily installed in existing planes. They will be available commercially in the near future.

Stalling of planes in the air occurs when they lose flying speed. Until the speed is regained a plane is unable to sustain itself in level flight and begins to fall.

A plane may stall when loss of power causes loss of speed. It may stall when the angle of attack of the plane is so increased that the airflow over the wings and body leaves the upper surface, and forms a turbulent wake or eddy toward

GIANT "SPARK PLUG"—This 14-foot condenser bushing is part of a huge automatic switch that will guard flow of electric power into a new Westinghouse war plant. The bushing conducts 230,000 volts of power into the tank on which the workman is standing, just as a spark plug in your automobile conducts electricity into the gas-filled cylinder.

MUMMY-CAVE VILLAGE—This is a model showing in miniature a cliff-dwelling as built in a cavern of Canyon del Muerto, Arizona, which was occupied about 1250 A.D. The Indians abandoned the cave about 50 years later because of drought and a military defeat, archaeological evidence indicates. This diorama is in the new Hall of Indian America at the Chicago Natural History Museum. (See also page 83)

the rear. Flying speed is recovered by nosing down and diving.

In the two new devices now ready, the pilot is warned of approaching stall by the sounding of a horn and the flashing of a light, Mr. George stated. These signals are actuated in one model when the airplane reaches a certain angle and the airflow is reversed, causing the turbulent wake. This forces a vane which projects from the leading edge of the wing to move upward, closing a switch.

The other model is operated when pressure reversal sucks a diaphragm upward and forces an attached metal plate against electrical contacts. It has a cut-out button which can be used during take-offs and landings.

The development work on one model was carried out in Pittsburgh by Westinghouse Electric & Manufacturing Company, together with the Carnegie Institute of Technology; the other in Troy, N. Y., by the W. & L. E. Gurley Company and Rensselaer Polytechnic Institute. Scientists of other institutions assisted.

Science News Letter, February 5, 1944

MEDICINE

Typhus Vaccine Reliable

➤ THE AMERICAN-MADE vaccine on which the United States and Britain are relying to protect their troops from typhus fever is at least as good as any other such vaccine, including those available to the Nazis.

This conclusion, based on a report from Germany of a "crucial experiment" by Dr. Erwin Ding, who describes himself as a storm troop leader, is drawn by the editor of the *Lancet* (Dec. 18, 1943) British medical journal.

The storm troopers must have suffered heavily from typhus fever, the *Lancet* editorial also suggests. Evidence for this is seen from the figures and other details in Dr. Ding's report.

He vaccinated six groups of persons with one or another of six types of typhus fever vaccine and left two other groups unvaccinated as controls. Although his results are given only in percentages, without stating how many persons were in each group, such figures as 0.5% complications suggest a number of the order of 200 in at least one group and show that several hundreds were involved altogether.

The vaccine used for American and British troops is made from the yolk sacs of infected developing eggs. The method was developed by an American scientist, Dr. Herald R. Cox, while on the staff of the National Institute of Health of the U. S. Public Health Service.

The difficult-to-make and costly Weigl vaccine from the intestines of infected lice; vaccines from lung suspensions from infected rabbits and dogs; and weaker preparations of egg yolk vaccine than the Cox vaccine, made in Marburg, Germany, as well as a Cox vaccine made in Germany, were those tested by the storm troop leader.

The weaker egg vaccines and a dog lung vaccine made in Rumania were less effective than the others. No deaths occurred in any vaccinated group except those receiving the Marburg vaccine. Deaths in the unvaccinated control groups ran to 20% and 33%.

The number of cases of typhus developing in the groups was unaffected by vaccination, but the severity of the disease was much less in the vaccinated.

Science News Letter, February 5, 1944

NUTRITION

Vegetables Prevented From Loss of Color

➤ DEHYDRATED vegetables and fruits are protected against loss of quality through the unwanted action of the life-agents, or enzymes, of their own cells during processing by a new method on which U.S. patent No. 2,340,170 has just been issued to John M. Baer of Chicago.

Certain plant enzymes promote oxidation. This is necessary while the plant is alive and growing, but if the enzymes continue their action after the vegetables or fruits have been peeled and sliced for dehydration they produce a dark coloration in such things as potatoes, peaches and apples, which reduces their market value. Heat destroys enzymes, so if the foods are pre-cooked before dehydration this trouble does not arise; but it is not always desirable to market the products in a cooked condition.

In Mr. Baer's process, the prepared vegetables or fruits are placed in a closed chamber and the air is rapidly pumped out, to a high degree of vacuum. Then they are quickly heated, though not to the cooking point, and the temperature maintained for only a couple of minutes. After that the temperature is reduced,

and dehydration carried to completion in the vacuum.

A second patent No. 2,339,757, has also been obtained by Mr. Baer on application of dry radiant heat to sliced potatoes in the vacuum dehydrating chamber. This brings them out as clear, translucent flakes, without the chalky appearance that often mars dehydrated potato slices.

Both of the patents are assigned to the Guardite Corporation.

Science News Letter, February 5, 1944

AERONAUTICS

Sound Travels Slower As Temperature Drops

➤ THE TEXTBOOKS are right when they state that the speed of sound in air decreases as the temperature decreases.

Readers are asked to correct the "Fundamentals of Rockets" story, SCIENCE NEWS LETTER, Jan. 15, 1944, page 34, column 3, paragraphs 7 and 8, so that they read:

"The velocity of sound is not much affected by the thinness of the air at high altitudes. It, however, is affected by the temperature and is *lower* at the low temperatures there prevailing.

"A drop in temperature of 100 degrees Fahrenheit would *decrease* the speed of sound by about 75 miles per hour."

Our thanks to the numerous readers who picked up and reported this troublesome error.

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ENGINEERING

Two-Boat Transportation For Bulldozers Patented

➤ TRANSPORTATION of a military type is offered by a new arrangement of boats on which Andrew J. Higgins, well-known New Orleans builder, has taken out patent No. 2,339,014. He uses two stoutly built pontoon units, connected by a platform underslung on a U-shaped framework between them, for the carriage of bulldozers, tanks, heavy artillery pieces and similar cargoes for battle.

The forward part of the platform can be raised slightly, serving as a kind of auxiliary bow to slap down waves that get in the way. When the bows touch bottom at the beach, this hinged portion is lowered to provide a landing ramp.

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PSYCHOLOGY

Test Your Science Talent

Questions in the examination used in the Third Annual Science Talent Search are designed to show how well you can reason and understand.

➤ IF YOU have wondered whether you have ability in science, here is a test that will give you some hint as to whether you can aspire to scientific achievement.

The questions reproduced on the following pages are part of the science aptitude test of the Third Annual Science Talent Search that has just been judged.

Try them on yourself or some friend. Here is how to do it. It is a test of how well you can read and understand the materials of science. There are two kinds of questions. In the case of questions 1 to 15, answer each by putting an X in the answer box corresponding to the number of the answer which is most nearly correct. In the case of questions numbered 56 to 60 and 91 to 97, first read each paragraph and then answer each of the questions in the same way. You should be able to do the test in less than an hour. Do all the questions in one sitting and do not look at the answers, printed elsewhere in this issue, until you have finished.

To discover scientific ability among the boys and girls just finishing high school, the Third Annual Science Talent Search for the Westinghouse Science Scholarships is being conducted this year. The first step of this nation-wide search for those likely to become the scientists of tomorrow has been completed. Nearly 15,000 copies of the science aptitude examination and other inquiry blanks were distributed to teachers in thousands of high schools throughout the nation.

The test, reproduced in part on the following pages, is only one of the techniques used in the selection of boys and girls who are scientifically gifted. In addition, each contestant filled out a personal data blank and wrote an essay describing some scientific project he has done or wishes to do. Teachers filled out a recommendation form and principals reported scholarship.

Forty contestants will receive free trips to the Science Talent Institute to be held in Washington, D. C., early in March. Of these, two will be selected to receive $2,400 Westinghouse Grand Science Scholarships to the college of their choice, eight will get $400 Westinghouse Science Scholarships, and additional Westinghouse scholarships which total $3,000 will be awarded at the discretion of the board of judges. Honorable mentions also will be awarded to call the attention of colleges and universities to those contestants of outstanding ability.

This will uncover scientific ability among those ready to enter college. Thus, exceptional youths, in the shortest possible time, will take up leadership in scientific research so important to the war effort and be ready to take a hand in the scientific world of the peace to come.

Science Service, sponsoring Science Clubs of America, is conducting the Science Talent Search as a part of the science club movement.

The aptitude examination does not test primarily what a person already knows about science. It is designed to tell how well you can reason and understand. Thus, even those who have no special training in science will want to try it.

The test was devised for the Science Talent Search by Dr. Harold A. Edgerton, director of the Occupational Opportunities Service of Ohio State University and Dr. Steuart Henderson Britt, of Washington, D. C. The most advanced testing methods developed over the past two decades, were utilized in constructing the test.

All the 80 boys and girls selected in the first two years of the Science Talent Search are now either in college or in the armed services. All but three of those in the Army or Navy have been sent to college for specialized scientific training.

Only time will tell whether those selected by this method will contribute to scientific research as expected. It is planned to follow for at least 10 years the careers of the winners and also of all those who completed entries.

Of the thousands of boys and girls who have taken the examination in the three searches conducted so far, not one

1. The sixth term of the series 2, 1, ½, ¼, is *1:* 0.125 *2:* 0.0625 *3:* 0.03125 *4:* 0.015625 □1 □2 □3 □4 1

2. The word geotropic is a technical word belonging to the field of *1:* biology *2:* physics *3:* physical chemistry *4:* geology □1 □2 □3 □4 2

3. Gutta-percha is a substance obtained from *1:* trees *2:* whales *3:* soybeans *4:* petroleum □1 □2 □3 □4 3

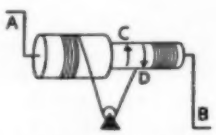
4. When the smaller wheel rotates in a clockwise direction, the larger wheel will *1:* rotate in direction A *2:* rotate in direction B *3:* move back and forth *4:* prevent the rotation of the smaller wheel

□1 □2 □3 □4 4

5. The adjective gnostic means pertaining to or characterized by *1:* aphorism *2:* insight *3:* disbelief *4:* knowledge □1 □2 □3 □4 5

6. Anchylosis of the elbow joint means that the joint is *1:* swollen *2:* infected *3:* sprained *4:* stiff □1 □2 □3 □4 6

7. In the differential windlass, with which crank and turned in which direction can a weight be raised most efficiently? *1:* A, C *2:* A, D *3:* B, C *4:* B, D



□1 □2 □3 □4 7

8. The word integument refers to *1:* unity or singleness *2:* organized *3:* internal *4:* skin □1 □2 □3 □4 8

9. Igneous is a term which primarily belongs to the field of *1:* geology *2:* theology *3:* agronomy *4:* physical anthropology □1 □2 □3 □4 9

10. Given the relationship, E = Vdgh: where E = lost energy, V = velocity, d = density of drop, g = force of gravity, and h = height, the amount of energy lost by drops of two liquids dropped into a glass container under the same conditions varies with *1:* velocity *2:* density *3:* gravity *4:* height □1 □2 □3 □4 10

11. The word *redolent* is most likely to occur in *1:* astronomy *2:* chemistry *3:* geology *4:* physics □1 □2 □3 □4 11

12. Four pieces of aluminum have been cast. The height and diameter of the cylinder, No. 1, are each one foot. No. 2 is a twelve-inch cube. No. 3 is a sphere with a six-inch radius. No. 4 is a pyramid with a base one foot square and an altitude of one foot. Which of the pieces weighs the least?

1. *2.* *3.* *4.*

□1 □2 □3 □4 12

13. *Vitreous* means *1:* calcified *2:* glassy *3:* white clay *4:* fused □1 □2 □3 □4 13

14. A tank is to be built so that its surface contains 30 square feet of steel, one-eighth inch thick when finished. The shape of tank having maximum capacity for the given amount of material is *1:* a cube *2:* a sphere *3:* an oblate spheroid *4:* a cylinder □1 □2 □3 □4 14

15. Which of the following shapes is cuneiform? *1.* *2.* *3.* *4.*

□1 □2 □3 □4 15

PARAGRAPH B: The pitch of sound, which is proportional to the frequency of vibration of the source, differs from the frequency of the source whenever the distance between the observer and the source is changing. This difference is marked whenever the velocity of motion is large with respect to the speed of sound — 1100 feet per second in air: the upper limit of audibility is about 18,000 vibrations per second. It can be shown that heard pitch is equal to the product of the frequency of vibration of the source and a quotient: the velocity of sound propagation and the velocity of the observer divided by the velocity of sound propagation and velocity of the source. When observer and source approach each other the velocities are added in the dividend and subtracted in the divisor. The inverse condition obtains when motion is reversed. (Let V = velocity of wave propagation, F = the frequency of the source of sound, S = the velocity of the source, O = the velocity of observer, and P = the observed pitch.)

QUESTIONS ON PARAGRAPH B:

...g the velocity of a source of vibration receding from a stationary observer is *1:* $S = \frac{F(V)}{V + P}$
2: $S = (F)\frac{V}{P}$ *3:* $S = F\frac{(V)}{P}$ *4:* $S = \frac{F}{P}$ 56

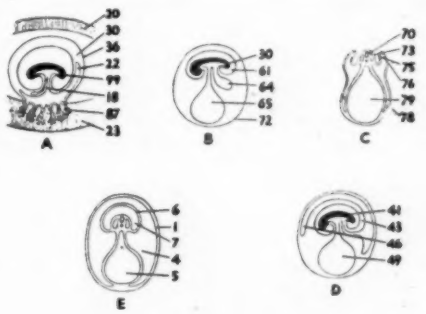
...train moves from an observer on another moving train, the observed pitch may be ...the formula *1:* $P = FV$ *2:* $P = \frac{F(V - O)}{V + S}$ *3:* $P = \frac{VF}{V + S}$ *4:* $P = \frac{V + S}{VO}$ 57

...The "wh..." on the fins of a bomb emit a frequency of F vibrations per second. The frequency ...nalyzed ...e ground is P vib/sec. How fast is the bomb approaching if V = Velocity of sound?
...: $\frac{VF + }{V}$ *2:* $\frac{FP}{V}$ *3:* $\frac{VP - VF}{P}$ *4:* $\frac{VP}{F}$ 58

...n Aug...1943, Colonel Hough was reported to have dived a plane at 780 mph. If a siren were ...ttached ...e tail of his plane and vibrated at 790 vib/sec. during the dive only, *1:* the siren could ...ot be h...n the ground on a straight line projected from his direction of dive *2:* the apparent ...pitch of ...iren dropped *3:* Hough could hear the siren intermittently *4:* the pitch of the ...ound h...s 10 vib/sec 59

...The wh...f a train A was set to deliver a sound of 650 vib/sec. An observer on train B moving at ...30 mile...our heard the whistle sound 20 seconds after he saw the steam of the whistle. The pitch ...of the s...bserved was determined to be 650 vib/sec. The distance between the observer and whistle ...after th...tle had been blown for 20 seconds is *1:* 4.1 mi. *2:* 5.6 mi. *3:* 3.2 mi. ...*3:* 7.5... 60

...GRAPH: There are four embryonic membranes in vertebrates ...yoke sa...allantois, the amnion, and the chorion. The amnion ...orion ...med by a fold of the somatopleure which rises up ...the em...nd fuses over it; the outer limb of the fold becomes ...rion an...inner the amnion. The yoke sac which extends ventral ...embryo...es smaller with development, the allantois spreading ...the an...and yoke sac, and the chorion. The allantois originates ...vagina...f the embryonal digestive tract, the outer wall of the ...s grow...to contact with the chorion; the two together form the ...allanto...mbrane. In mammals the placenta is formed by the ...tion o...horio-allantoic membrane into the wall of the uterus, ...etrati...ng the form of treelike ingrowths which are called ...ic vill...



...IONS ...PARAGRAPH G:

...the e...ic diagrams above were to be arranged in sequence from oldest to youngest, which would ...e the s... *1:* A *2:* B *3:* C *4:* D 91

...whi...ram does the allantois first appear? *1:* B *2:* C *3:* D *4:* E 92

...Which ...onic membrane is in closest contact with the skin of the embryo? *1:* allantois ...e amn... *3:* yoke sac *4:* chorion 93

...tructu...in C is identified by what number in diagram A? *1:* 30 *2:* 22 *3:* 18 *4:* none 94

...tructu...in C is identified by what number in diagram E? *1:* 7 *2:* 1 *3:* 4 *4:* 6 95

...What ...re in C is the same as structure 99 in diagram A? *1:* 78 *2:* 76 *3:* 79 *4:* 70 96

...What ...re in D is the same as structure 4 in diagram E? *1:* 41 *2:* 43 *3:* 46 *4:* 49 97

made a perfect score. When you try this selection of questions from the examination you should, therefore, not expect to find that you have checked all the right answers.

To save your time only typical questions out of the original three-hour examination are reproduced on the following pages.

Don't read further. Cover up this paragraph until you have taken the test. Here are the correct answers:

1, 2; 2, 1; 3, 1; 4, 3; 5, 4; 6, 4; 7, 3; 8, 4; 9, 1; 10, 2; 11, 2; 12, 4; 13, 2; 14, 2; 15, 2; 56, 2; 57, 2; 58, 3; 59, 1; 60, 1; 91, 4; 92, 1; 93, 2; 94, 4; 95, 4; 96, 4; 97, 2.

If more than ten were scored right you did better than three-fourths of the scholars.

Science News Letter, February 5, 1944

ENGINEERING

X-Ray Tube Locates Foreign Bodies in Tires

➤ HIDDEN nail-in-the tire troubles are exorcised by the invention on which G. P. Bosomworth of Akron, Ohio, received patent No. 2,339,550, rights in which are assigned to Firestone Tire and Rubber Company. The device consists of a powerful X-ray tube attached to a lead-shielded frame, over which automobile wheels may be slowly rotated without being removed from the car. The operator, peering through an aperture at a fluorescent screen, sees nails, sharp metal scraps and other tire-hurting foreign bodies in dark silhouette. He marks the spot with chalk for the guidance of the repair man.

Science News Letter, February 5, 1944

HORTICULTURE

Hand-Pushed Weeder Invented for Gardens

➤ A NEW TYPE of hand-pushed, wheeled, weeding implement, is covered by patent No. 2,339,905, obtained by W. J. Baker of Southgate, Ky. It resembles in principle the larger, power-drawn implements known as subsoil or fallow cultivators now coming into favor in soil-conserving agricultural practice. Long, flat, relatively narrow blades are drawn through the soil just below the surface, neatly shearing off the roots and leaving the tops to wilt and die and form a mulch.

Science News Letter, February 5, 1944

MILITARY SCIENCE

Cloaks of Invisibility

Soldiers in this mechanized war are often making use of natural materials, such as hay for pseudo-haystacks, to conceal their hideout devices.

By DR. FRANK THONE

➤ CAMOUFLAGE using natural materials, collected on the spot, is very definitely no new thing under the sun. According to the record, Adam and Eve tried it—though not successfully. They wove leaves into partial coverings for themselves, and then hid among the trees.

The Lord might have shelled them out with thunderbolts and brimstone, but he chose a war of nerves instead. Adam's bad conscience brought him out into the open, to admit his fault and take his medicine.

Descendants of this early pair of unsuccessful camoufleurs have been using variants of their technique ever since, but the basic principles have remained unchanged, and the closer they are adhered to, the better the concealment.

In this most modern and mechanized of all wars we find the most ancient and primitive of materials used alongside the newest inventions of science in giving fighting men the gift of invisibility which is more valuable than the thickest armor. Grasses and leaves, vines and tree branches are now utilized by applying them to a dozen mechanically ingenious devices, so that what seems to be a dense bush at one instant is at the next completely gone, giving the suddenly unmasked gun within or behind it an unobstructed field of fire.

At the great Army Engineer Corps training center near Washington—Ft. Belvoir, Va.—some of the most inventive-minded of the younger officers are constantly working on the construction and improvement of these field-built concealment gadgets. Their devices are reminiscent of the wilderness mechanics of the pioneer trappers, modified by a modern-small-boy penchant for the use of plenty of wire, string and nails.

Many of their works are of necessity not open for public inspection at present. What Hitler and Tojo don't know won't hurt them—until it jumps out and bites them. Other things, however, may legitimately be shown and described. Indeed, in one part of the huge military reservation there is what is known as a Demonstration Area, which is a kind of outdoor museum of typical camouflage techniques, useful in the instruction of officers who will presently go forth and do in like manner. It can also be shown to visiting officials, newspapermen and such few other callers as are permitted at a military post nowadays.

STROLLING NOWHERE—This convincing country road can be laid down anywhere to fool the enemy with two strips of light-colored cloth for ruts. This photograph, as well as the others on camouflage, was taken by Fremont Davis, Science Service staff photographer, at the Demonstration Area of Ft. Belvoir, Va.

Strange Object

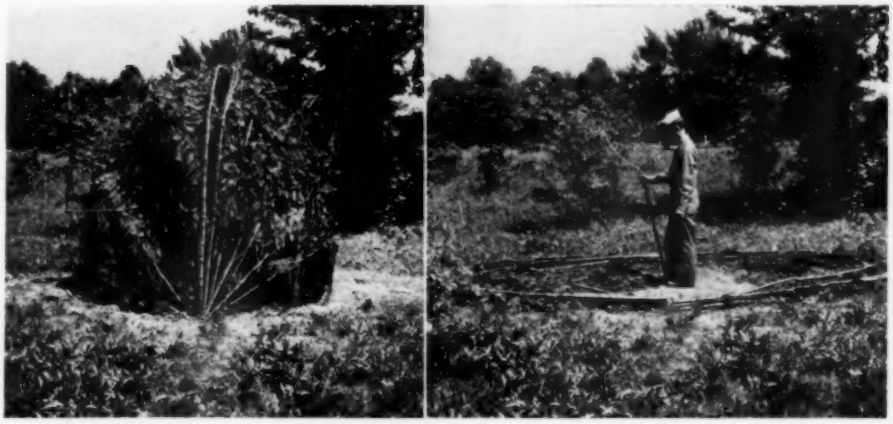
One of the first things you see in this military House of Delusions is a strange-looking object, about the size and shape of a small stack of hay. It is so obviously fake, however, that you wonder how it could deceive anybody. This, the young officer in charge explains, is just the foundation of a camouflage haystack; the hay is to be attached later, to match whatever kind is being mowed in the neighboring field. There is no point in dressing it up in alfalfa if the farmer is going to stack peanut stalks or soybean hay.

As you approach a little closer, suddenly the strange object cracks down the middle and collapses to both sides. In a split second you see that a soldier was inside, with room enough for a tommy gun or a mortar or an anti-aircraft machine gun. The collapse of the bogus haystack gives him unobstructed scope for his weapons in all directions.

Framework of Poles

The framework of the device, you see on closer examination, is a series of flexible poles cut from green wood and bent into bows like those of an old-fashioned buggy-top. Two such buggy-tops set edge to edge make a completely closed booth, when covered with netting and garnished with hay to match the local crop. A simple wire catch, that can be loosened with one quick jerk, is all that holds it up.

Even simpler is the next device, that covers a machine-gun pit. This one is perfectly flat, the netting stretched on a rus-



BLIND—From a distance or from the air, the gadget on the left would look like an innocent haystack, especially after it was covered with hay or straw from nearby fields. The right picture shows how it can be collapsed.

tically built but well-braced pole frame. At one corner it pivots on a stout post sunk solidly into the ground. A push from one of the concealed gunners swings it sidewise, uncovering the position and leaving the gun free to fire.

A variant of this has two sliding halves, that can be shoved to right and left, permitting the concealed weapon to go into action.

Can Be Quickly Installed

Most of these gun-position covers are built as if for anti-aircraft weapons. They can be quickly installed around advanced landing fields, ammunition dumps, truck parks and other tempting targets for hostile airplanes. However, they are also well adapted for concealing installations of ground machine guns, anti-tank cannon, and anything else that needs the protection of invisibility with minimum expenditure of engineers' labor and (most especially) of expensively hauled-in materials.

"Flat-top" seems to be the engineers' favorite type of concealing cover. Get up poles around the edges of your gun pit, supply dump or what have you, stretch netting over the top, attach materials to make it match surrounding fields as nearly as possible, then slope the sides to do away with sharp-edged, betraying shadows. You have virtually lifted the ground surface and made of it a shield against the flying enemy's eye.

In using native and natural materials, the camoufleur would rather operate in fall and winter than in summer or late spring. Foliage cut when it is green begins to wilt in a few minutes if the day is hot, and in a few hours at most it is worse than useless. Autumn-colored leaves, on the other hand, keep their hues indefinitely; a simulated heap of dead leaves or tangle of yellowing vines will probably be good for as long as you want to hold the position.

So difficult has the use of natural green foliage proved itself that the camoufleurs have simply given it up, at least for the time being, and are using a fairly durable green water paint that can be sprayed rapidly on withering leaves, to keep them in some semblance of their fresh appearance. This paint sticks for several weeks, even against moderate rains.

There is one exception to the trouble with wilting and withering in green leaves—evergreen tree foliage. As the name implies, these needle-leaves stay good for a considerable time, even in the hottest, droughtiest weather. When they finally die they turn a rusty red; and since there are plenty of sick evergreens in any natural woodland that have the same unhealthy color in their foliage even this is not a betrayal of position.

How effective the dull-colored foliage of rough-leaved ground plants and shrubs and gray, dried grasses and sedges can be is well illustrated by a story that has drifted back from Kiska. Soldiers bidden to camouflage their position were reproved by their colonel the first time he spotted it on his rounds of inspection. The second time he saw it, despite efforts at improvement, the boys got a stiff bawling-out. They made up their minds there would be no third time, and really started "cooking with grass." On his next inspection tour, the colonel stepped on their roof and very literally crashed the party, before he discovered the whereabouts of the position.

Garnished Netting

The netting which the camoufleurs stretch on their frameworks of tree boughs or saplings and wire is still to a very large extent the same galvanized chicken-wire that was popular during World War I. However, to save metal and conserve shipping space, netting of cotton cord is being given a workout. Most satisfactory results so far have been obtained with the (*Turn to next page*)

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Do You Know?

Paper napkins and handkerchiefs are now unobtainable in England.

Insects cause an annual loss of about 10% of all food and fiber crops.

Victory Gardeners should order seed early, the Department of Agriculture advises.

One successful Army *tank engine* is composed of five automobile motors linked to a central crankshaft.

In three years of war, more than 5,000 merchant *ships* and 4,000 naval ships have been repaired and put back in service by Canadian shipyards.

Nearly one-quarter of *China*, land which once grew crops and great forests, is now a desert of bare hills without enough soil to support the growth of the toughest weeds.

In 1940 and 1941 approximately 15,000,000 *rubber* trees were planted in Latin America; the Army furnished bombers to carry rubber tree seeds from Liberia and Brazil to various distribution points.

Tin is used in every war machine on land or sea or in the air; a battleship has 76 tons of it; bomb sights, gas masks and radio equipment contain tin; it is used almost exclusively in combination with other metals.

The cost of *rearing a child* from birth to 18 years of age is approximately $7,500 in American families with an average income of $2,500 a year; deducting cost of being born, the expenditure is about $400 a year.

Rock bursts in mines, which cause injuries and death to many miners, may be predicted by a new electrical instrument sunk 30 feet in the rock; noises inaudible to the human ear that precede breaking are recorded.

Known reserves of domestic *bauxite* of all grades have been increased by several million tons, and those of alumina-bearing clays by more than 100,000,000 tons, through the intensive exploratory program of the United States government.

From Page 91

kind of machine-made netting used by shrimp fishermen. It is cheap, light, very tough and durable, and can be taken down and used repeatedly.

The materials fastened to the net, whether native foliage or "issue stuff," are all collectively known as "garnish" by workers in the camouflage business. During World War I days, camouflage nets were usually garnished with strips of dyed burlap woven into them or with bunches of raffia tied onto the wires. Both these materials are scarce in the present war, so that other things are being tried out, for use when native materials are unobtainable or for some reason inadvisable.

Substituting for burlap is the coarse cotton fabric known as Osnaburg. This stuff got its name from the Swiss monastery where it was first woven. Little did the peaceful monks imagine where their rough, unluxurious but strong and durable cloth would wind up! Osnaburg does make very good garnish, it is reported.

Of course, camouflage is not utterly impenetrable. Little mistakes may be made, edged shadows permitted to fall, fresh cuts left visible on tree stumps—any one of a thousand clews that an alert enemy might read. So the camoufleurs, when they have time, build extra camouflage installations, which they expect the enemy to see and perhaps to attack. The more bombs and bullets he spends on these ghost positions, the fewer he'll have for the real ones.

Science News Letter, February 5, 1944

SPIDER HOLE—If you were a soldier in the peaceful field shown in the top picture and saw no sign of the enemy, you might be very close indeed to death. Look at the bottom picture to see where a sniper might be hidden.

PSYCHOLOGY

Psychologists To Unite

➤ IN TUNE with modern trends of rationing and restrictions, a movement is now on foot to combine the nine leading national psychological associations and groups of psychologists into just one large national association.

Details of the merger are being worked out by a committee appointed by representatives of all the present organizations.

Final action ratifying the new constitution is expected on the part of the two largest organizations, the American Psychological Association and the American Association for Applied Psychology, in September. Difficulties may arise due to the fact that the annual business meetings of these organizations were canceled last year due to war-caused transportation difficulties. It is not now known whether a meeting will be held for this purpose, whether action will be taken by the administrative councils of the organizations, or whether members will be asked to vote by mail.

The new organization, which will also be called the American Psychological Association, will have, it is planned, a number of divisions, each with its own chairman, secretary and other officers. The diyisions will sponsor programs, the annual meetings and may also publish journals. Any member may belong to one or more divisions.

Government of the new association will be by a Council of Representatives to be elected by the various divisions and regions and by certain unorganized groups. The Council will meet annually and elect a Board of Directors and several other boards and committees to do the work of the association.

It is anticipated that 4,000 psychologists will be members of the new association. Organizations who appointed representatives to plan the merger include: American Psychological Association, American Association for Applied Psychology, Society of Experimental Psychologists, Society for the Psychological Study of Social Issues, Psychometric Society, National Institute of Psychology, National Council of Women Psychologists, Department of Psychology, American Teachers Association, and Section I, American Association for the Advancement of Science.

Science News Letter, February 5, 1944

PHOTOGRAPHY

War Photo-Mapping

Aerial photography contributes materially to the success of military and naval operations. Many glaring errors in maps found by photogrammetry.

➤ AERIAL photography is contributing materially to the success of U. S. military and naval operations. But in photo-mapping there is always a feeling of pressure, as no map is ever completed as early as might be desired, Lt. Col. E. E. Pollock, U.S.M.C., told members of the American Society of Photogrammetry meeting in Washington.

On one occasion U. S. ships were to enter a little-known body of water, he related. Aircraft were sent to photograph the water area between two large islands. After the film had been developed and the pictures fitted together, these prints revealed the existence and location of submerged reefs. That same night a naval battle was fought in this very body of water, he said.

Practically all mapping done in the South Pacific theater since we entered the war, Colonel Pollock pointed out, has been in order to bring up to date charts based on surveys made in the 1870's and 1880's. Many glaring errors were found and corrected in these charts.

"At one point the map measurement of the width of the island was 14.2 miles, whereas a check by photogrammetric methods revealed the width to be 21.1 miles," he stated, referring to Santa Isabel Island.

Mapping crews are frequently attacked by Japanese aircraft or are the object of enemy fire, Colonel Pollock stated, as well as confronted by navigation problems over jungle-covered islands where each hill or shoreline looks alarmingly like the next.

Science News Letter, February 5, 1944

Pilots Expected to Run

➤ "THE JOB of the mapping and photographic pilot is a tough one," Col. James G. Hall, U.S.A.A.F., told members of the society. "They are the only individualists left in aerial warfare, and they are the only pilots for whom it is both a duty and an honor to run from the enemy."

The success or failure of a task force operation or an entire campaign may depend on photographic reconnaissance, Colonel Hall stated. At one stage in the battle of Tunisia, the artillery preferred to fire from interpreted photographs rather than from maps.

The accuracy of fire from these photographs was so great that in many cases the enemy guns received a direct hit and some thought a new kind of secret weapon was being used. German and Italian prisoners said no one could understand how their positions were discovered since they had been moved only a few days before the attack.

Science News Letter, February 5, 1944

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ASTRONOMY

Sunspot's Appearance Ends 28-Day No-Spot Period

➤ THE APPEARANCE of a small sunspot on Saturday, Jan. 22, marked the end of the longest period without a sunspot of appreciable size since the early 1930's.

The sun's surface had been unmarred by any identified spots since Dec. 25. A few faint markings were discovered on plates made at the Mount Wilson Observatory Jan. 19 and 20, but were not found on plates made at the U.S. Naval Observatory. Thus 28 days had elapsed since the last sizable sunspot was visible.

Science News Letter, February 5, 1944

GEOLOGY

Award Given for Work On Aerial Mapping System

➤ THE TRI-METROGON system of aerial photography being used to make our fighting forces' war maps got a new citation when Lt. Col. Gerald Fitzgerald, chief of the aeronautical chart division of the Army Air Forces, received, at the Washington meeting of the American

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Society of Photogrammetry, the first Fairchild Photogrammetric Award from General H. H. Arnold, commanding the Army Air Forces.

Colonel Fitzgerald was formerly senior topographic engineer of the Alaskan Branch of the U. S. Geological Survey; he directed the pre-war as well as the war development of this speedy method of charting the hills and valleys by use of cameras flown high overhead. The new award is to be given annually by the American Society of Photogrammetry.

Science News Letter, February 5, 1944

CHEMISTRY

Paper Tags Being Used For Overseas Shipping

➤ PAPER is now being made to do the job of metal and cloth tags in labelling war materials going overseas. The National Bureau of Standards and cooperating manufacturers have developed a paper material for tags that has very high resistance to tearing and scuffing, dry or wet. It eliminates the further use during the war of cloth, metal, and abaca manila hemp fiber as materials in shipping tags.

Federal specifications for tagboard material, recently issued, substitute noncritical fibers for the manila hemp and secures wet strength, as well as resistance to scuffing, through the use of synthetic resin. The tearing resistance of this board is equal to that of manila hemp board when dry, and when wet it is greater.

Instead of metal eyelets, paper patches affixed with water-resistant adhesives are specified. They withstand submersion in water indefinitely without coming loose from the tags, it is claimed.

Science News Letter, February 5, 1944

GRAVITATION

This pamphlet on gravitation is the third supplement to Essays on the New Vortex Atom. The two previous supplements dealt with the Heavier Elements and the Carbon Atom. Any or all of these may be obtained free of charge.

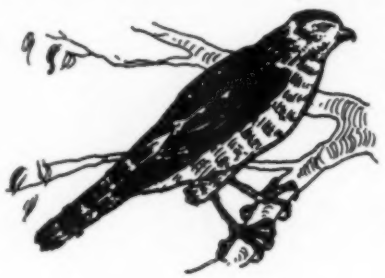
The author claims to have accounted for gravitation on a simple hydromechanical basis, capable of experimental test, and not depending on curved space, ether sinks, or other metaphysical concepts. It is the author's contention that gravity is a physical force, and therefore requires a physical explanation.

C. F. Krafft

1322 Amherst Ave. - Richmond 22, Va.

WOODCRAFT

NATURE RAMBLINGS by Frank Thone



Outline for Survival

➤ NAVY FLIERS are now being given special instructions in how to keep alive and find their way back to friends if forced down at sea or in the wilderness. Thereby these highly trained young men are enabled to "live to fight another day," and eventually to see their homes again.

Tricks in the hard trade of staying alive and keeping moving towards base range all the way from finding out which way is south to snaring wary game, from catching fish without a hook to boiling water without a pot. Some of them are things that every Boy Scout knows, others can be learned only from the best-educated savages.

A compendium of this varied but vital knowledge has just been put into book form by two young Navy officers who are twin brothers: Lieutenants (j.g.) Frank and John Craighead. Their book is published by the U. S. Naval Institute. ($2). In addition to its primary use as a text in the survival course, it is available for general distribution to civilian readers.

The twin authors began their careers in living outdoors while they were still schoolboys in Washington, D. C. They became interested in capturing young hawks and training them for the ancient sport of falconry. This involved the acquisition of a lot of skills, such as cliff and tree climbing, camping out without a tent, and living off the country generally. They have, therefore, first-hand knowledge of the things they write about.

Although such things as fish-hooks, cord and matches are included in emergency kits furnished all fliers nowadays, they are assumed as lost for the purposes of the new manual, and the student of the art of staying alive is shown how to make his own fish-hook out of bone or shell, or a bit of wood and a thorn; how to make a usable cord out of bark fiber; how to start a fire with a fire-drill or a fire-file. There are directions and diagrams for making a considerable variety of snares and traps. Wild-food lore includes such diverse information as cautions against tropical fishes with poisonous flesh and hints on how to detect the well-camouflaged ptarmigan on an arctic tundra.

Since the new book is not meant to be carried in the pocket and used only when the emergency actually arises, it goes in for completeness rather than compactness, and so tells how to live in any kind of wilderness, whether tropic, arctic, desert, or mountain heights. The list of wild food plants and animals, therefore, is exceedingly varied; yet it is surprising how many things we ordinarily think of as temperate-zone species are to be found on tropical uplands as well.

Science News Letter, February 5, 1944

AERONAUTICS

Airplane Vapor Trails Formed by Condensation

See Front Cover

➤ VAPOR TRAILS, the beautiful but dangerous "artificial clouds" which sometimes occur behind airplanes flying at high altitudes, are caused only when certain atmospheric conditions exist which are conducive to condensation.

There are two main reasons for the formation of these airplane wakes: First, the exhaust gases from the engines contribute an additional amount of moisture to the already humid atmosphere, and the dust and carbon particles discharged form what meteorologists call condensation nuclei—minute pieces of matter on which water molecules readily collect. Second, the transient reduction of pressure which occurs over the wing of the airplane causes a temporary cooling of the air which also fosters condensation of water molecules.

Why vapor trails could help enemy anti-aircraft spotters is evident from the U. S. Army Air Forces picture of bombers over Bremen, Germany, shown on the cover of this SCIENCE NEWS LETTER.

The B-17 in the foreground, unloading its sticks of bombs which are destined for the shipyards below, is out of the range of the flak bursts seen in the lower right portion of the picture.

Science News Letter, February 5, 1944

• Books of the Week •

➤ METEOROLOGY has thousands of students nowadays where it formerly hardly had tens, and teaching aids have multiplied accordingly. One of the more interesting of recent productions in this group is METEOROLOGY WORKBOOK, WITH PROBLEMS, by Peter E. Kraght, senior meteorologist of American Airlines. Although a laboratory manual in appearance and format, it contains the meat of a complete text for beginning students. (*Cornell Maritime Press,* $2.25)

Science News Letter, February 5, 1944

➤ CITRUS FRUITS, in all their aspects, are to be given monographic treatment in a new series of books, THE CITRUS INDUSTRY, under the editorship of H. J. Webber and L. D. Batchelor. Volume I, treating of history, botany and breeding, is just out. Notable among its ten chapters is one by W. T. Swingle, in which the botany of the genus and its wild relatives is given comprehensive treatment for the first time in many years (*See SNL,* Feb. 20, 1943). A companion chapter, by Dr. Webber, extends the botanical discussion to cover the cultivated varieties of Citrus; the same author contributes three of the other chapters. (*University of California Press,* $7.50)

Science News Letter, February 5, 1944

➤ A BIRD'S-EYE VIEW of a vast and fascinating subject is given in CIVILIZATION AND DISEASE by Henry E. Sigerist (*Cornell University Press,* $3.75). In vivid, pungent style, the author speeds the reader over the course of history tracing the relation between disease and wars, social life, dress, literature, art, music, religion, philosophy, the law and economics. The book is based on the Messenger Lectures on the Evolution of Civilization which the author gave at Cornell University in 1940-1941. With its many interesting illustrations, it will serve not only to entertain and inform but doubtless to orient the reader for an approach to the problems of disease and civilization that the post-war world will pose.

Science News Letter, February 5, 1944

➤ FALLACIES of public housing are debunked in Nathan Straus' THE SEVEN MYTHS OF HOUSING. (*Alfred A. Knopf,* $2.75) Many who believe that "there are no slums in my town," "public housing does not clear slums," "the government should buy up the slums," "public housing is costly and extravagant," "public housing does not rehouse families from the slums," "the slum dweller creates the slums," and "public housing injures private business and threatens to bankrupt the country" will be converted by the facts and figures given in this book by the first administrator of the United States Housing Authority. The past record of public housing is carefully analyzed and a specific program for the future offered.

Science News Letter, February 5, 1944

➤ PLANT DISEASES are now known to include so many due to filterable viruses that a special subdivision of plant pathology, to treat of this special group, is definitely in order. The first appearance of F. C. Bawden's PLANT VIRUSES AND VIRUS DISEASES was therefore hailed as timely; even more so, now, is a thoroughly revised second edition, bringing the subject down to date, with particular attention to recent findings made with the aid of electron microscope and supercentrifuge. (*Chronica Botanica,* $4.75)

Science News Letter, February 5, 1944

Just Off the Press

APPLIED DIETETICS: The Planning and Teaching of Normal and Therapeutic Diets —Frances Stern—*Williams & Wilkins,* 265 p., $4. 2nd ed.

BELOVED SCIENTIST: Elihu Thomson, A Guiding Spirit of the Electrical Age—David O. Woodbury—*McGraw-Hill,* 385 p., illus., $3.50.

THE CITRUS INDUSTRY: History, Botany, and Breeding—Herbert John Webber and Leon Dexter Batchelor, eds.—*Univ. of Cal.,* 1,028 p., illus., $7.50. Vol. 1.

ELEMENTARY TOPOGRAPHY AND MAP READING—Samuel L. Greitzer—*McGraw-Hill,* 157 p., illus., $1.60.

FROG RAISING—Albert Broel—*Marlboro House,* 154 p., illus., $5, paper.

HEALTH AND HYGIENE: A Comprehensive Study of Disease Prevention and Health Promotion — Lloyd Ackerman — *Jaques Cattell,* 895 p., $5.

HEALTH FOR THE HAVING: A Handbook for Physical Fitness—William R. P. Emerson—*Macmillan,* 146 p., illus. $1.75.

HOW TO ABANDON SHIP—Phil Richards and John J. Banigan—*Infantry Journal,* 196 p., illus., 25c, paper. For service men only.

HUMAN CONSTITUTION IN CLINICAL MEDICINE—George Draper, C. W. Dupertuis and J. L. Caughey, Jr.—*Hoeber,* 273 p., illus., $4.

ITALIAN DICTIONARY FOR THE SOLDIER—Frank Henius—*Infantry Journal,* 218 p., 50c., paper.

ITALIAN SENTENCE BOOK FOR THE SOLDIER—Frank Henius — *Infantry Journal,* 92 p., 50c, paper.

THE LEICA MANUAL: A Manual for the Amateur and Professional Covering the Field of Miniature Camera Photography—Willard D. Morgan, Henry M. Lester and others—*Morgan & Lester,* 551 p., illus., $4, 9th ed.

THE MAMMALS OF CHILE—Wilfred H. Osgood—*Field Museum,* 268 p., illus., $1.75, paper.

MEDICAL ASPECTS OF AVIATION: Speed and Acceleration—Ernst Jokl—*Pitman,* 104 p., illus., $3.

ORGANIC CHEMISTRY FOR THE LABORATORY—C. W. Porter and T. D. Stewart—*Ginn,* 222 p., illus., $2.

OUR CONSTITUTIONAL FREEDOMS—Robert E. Cushman—*Nat. Found. for Ed. in Amer. Citizenship & Public Affairs Comm.,* 32 p., illus., 10c., paper.

PLANT VIRUSES AND VIRUS DISEASES—F. C. Bawden—*Chronica Botanica,* 294 p., illus., $4.75, 2nd ed. rev.

PLASTICS CATALOG: The 1944 Encyclopedia of Plastics—*Plastics Catalogue,* 990 p., illus., $6.

PRACTICAL EMULSIONS: A Handbook of Emulsions, Emulsifiers, and Methods of Formulating and Making Emulsions of Practical Value in Industry—H. Bennett —*Chem. Pub. Co.,* 462 p., illus., $5.

SCOUTING AND PATROLLING: The Soldier, The Enemy, The Ground—*Infantry Journal,* 124 p., illus., 25c., paper.

SYNTHETIC ADHESIVES — Paul I. Smith — *Chem. Pub. Co.,* 124 p., illus., $3.

SYSTEMATIC REVIEW OF THE CHIPMUNKS (GENUS EUTAMIAS) OF CALIFORNIA — David H. Johnson—*Univ. of Cal.,* 145 p., illus., $1, paper.

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•New Machines and Gadgets•

⚙ *MANICURING attachments for office pencils may become standard equipment. A device for this purpose which slips on the eraser end of the pencil has been recently patented. When not in use the fingernail cutter and cleaner is covered with a metal or plastic cap.*

Science News Letter, February 5, 1944

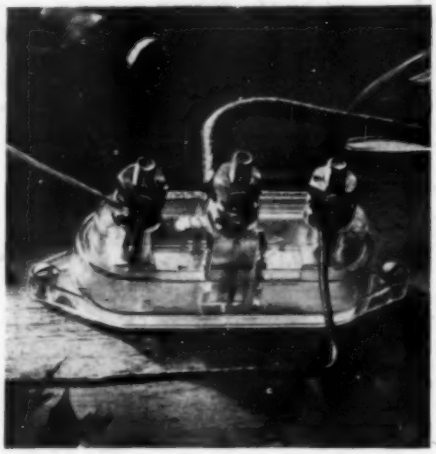
⚙ *SYNTHETIC rubber "overcoats" of gasoline-absorbent material placed around bullet-sealing fuel tanks in airplane wings prevent the formation of a highly explosive air mixture. They absorb and hold the gasoline that escapes from a tank pierced by a bullet before the hole seals itself.*

Science News Letter, February 5, 1944

⚙ *SNOW PUSHER to clear sidewalks and drives, recently patented, resembles somewhat a lawn-mower without revolving cutting blades. A fixed flat or slightly curved scraper blade, mounted in front of the wheels, can be raised and dropped to chip ice from walks and driveway. A push handle operates it.*

Science News Letter, February 5, 1944

⚙ *LIGHTNING arresters housed in transparent plastic cases are used by the Army. During electrical discharges in thunderstorms, the glow of small neon tubes indicates satisfactory connections*



between aerials and the ground. The picture shows the arrester and transparent case. The electrodes sealed within are protected from weather, dirt and insects.

Science News Letter, February 5, 1944

⚙ *REVOLUTIONS of a motor armature after the electricity is cut off are accurately counted by use of a phototube. A tiny mirror fixed on the shaft of the armature reflects on each revolution a beam of light to a phototube which converts the light into electrical impulses. These pass through a special galvanometer whose deflections are recorded on a photographic film.*

Science News Letter, February 5, 1944

⚙ *LIGHT, flexible, steel pipe lines, to supply combat troops with water, gasoline and other liquids, are made in spirally-welded units 20 feet long and four inches in diameter. Each unit weighs only 90 pounds. Specially designed couplings, quickly applied, connect the units. The line is flexible enough to be used on any terrain.*

Science News Letter, February 5, 1944

⚙ *SMOKE FLOATS, which protect naval vessels with clouds of dense smoke, are converted paint pails that hold smoke-generating chemicals and fuse attachments. They are fitted into hollow flotation chambers with attached skirts to hold them upright in the water, but are designed to sink when empty.*

Science News Letter, February 5, 1944

If you want more information on the new things described here, send a three-cent stamp to SCIENCE NEWS LETTER, *1719 N St., N. W., Washington 6, D. C., and ask for Gadget Bulletin 193.*

Question Box

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BOOKS

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